1. PURPOSE

This Lockout/Tagout Program has been established to identify a process and responsibilities for hazardous energy isolation and control of machines, systems and equipment to ensure protection of personnel working within the scope described below. The applicable standards are 29 CFR 1910.147, *Control of Hazardous Energy*; 29 CFR 1910.333, *Selection and Use of Work Practices;* and 29 CFR 1910.335, *Safeguards for Personnel Protection.*

In addition, this Program establishes the requirements for the proper isolation and configuration control of systems for nuclear safety, nuclear criticality safety and hazardous materials safety. In cases of permanent decommissioning or isolation, the requirements within MAN-066-COOP, *Site Conduct of Operations Manual* (COOP Manual), and of Chapter 36 of this Manual (Electrical Safety) **Should** be followed subsequent to the use of this procedure. Chapter 8 of this Manual (Marking Physical Hazards, Barricades and Accident Prevention Signs) gives additional information on the use of "caution" and "danger" tags.

2. SCOPE

This program covers installation, verification, working within the boundaries of, and removal of Lockout/Tagouts (LO/TOs), Lockouts (LOs) and Tagouts (TOs) at the Site. This is the Site energy isolation program, required in 29 CFR 1910.147, .333 and .335, with the addition of construction and demolition activities. This program is also structured to include the Site's isolation requirements associated with nuclear criticality safety, nuclear safety and hazardous materials safety, as supported by the Site COOP.

Existing LO/TOs applied under previous LO/TO program requirements may remain in place, and need not be updated to these requirements, unless modified before removal.

Isolations to be performed under Section 5.7, Single Point/Single Shift (SP/SS) Isolations are those that the controlling organization has determined can be safely executed on Single Point/Single Shift (SP/SS) tasks requiring only single point, single shift isolation. LO/TOs **SHALL** be completed in accordance with Section 5.1-5.6 for all other system categories.

Isolations performed under Section 5.7 may not be used for systems that are classified by the facility Authorization Bases as "Safety Class" (SC 1/2), or "Safety Significant" (SC 3). Utility clearances implemented by outside contractors or utility companies within the boundaries of the service easement must follow their own procedures. RFETS plant power **may** use their own clearance procedure on all 13.8kv power electrical isolations.

3. REQUIREMENTS DOCUMENTS

The contractual documents that form the basis for the requirements of this Chapter are DOE Orders 440.1A, and 5480.19.

4. RESPONSIBILITIES

4.1 PROJECT AND / OR FACILITY MANAGERS

Project and/or facility managers will designate, electronically, or in writing, their Lockout/Tagout Manager(s) (LTMs). They will also ensure that the K-H Lockout/Tagout Program manager (LO/TO PM) has the current list of designated LTMs, and that the quarterly assessments are completed.

4.2 LOCKOUT/TAGOUT MANAGER (LTM)

The LO/TO manager **SHALL** execute the requirements of the LO/TO program.

- Control issued and unissued LTPs (LO/TO permits), keys, locks, tags, PCLs (personal controlled locks) lock boxes, multi-lock hasps and other LO/TO devices.
- Ensure that no tags, locks, improvised or makeshift tags or notes are placed on equipment in lieu of the requirements of this program.
- Destroy used tags.
- Ensure that all locks, keys and locking devices used for the LO/TO program are secured at all times. Keys **SHALL NOT** be duplicated and **SHALL** be kept in a designated and secured location. Only personnel with PILs (personal isolation lock) and PCLs are permitted to have and control the key to his/her lock.
- Review, verify and approve LO/TOs or TOs with the Responsible Supervisor, or the RS's designee, and approve the removal of a LO/TO or TO for his/her assigned area/systems (this can be done by remote phone request).
- Ensure "affected employees" are notified before LO/TO is applied and after the LO/TO is removed, but before the equipment is started. See Appendix 1 for definition of "affected employees".
- Replace locks and tags applied in emergencies by the shift superintendent(s), with his/her own issued locks and tags.
- Ensure that green PCL locks, and in addition, blue PIL locks, in buildings where SP/SS LO/TOs are used, are available to all LO/TO workers.
- Issue tag(s), lock(s), key(s) and multi-lock hasp(s) or lockbox, as appropriate, along with a working copy of the LTP, to the isolator.
- In facilities with multiple shifts, at shift change, ensure that oncoming LTM(s) and affected employees are made aware of the current status of LO/TO or TO.

4.3 RESPONSIBLE SUPERVISOR

- Reviews, verifies and approves LO/TO or TO with LTM, after reviewing drawings, performing walkdowns, and any other activities necessary to ensure that the proposed LO/TO is correct and adequate. When the LTM and the Responsible Supervisor (RS) are the same person, or at the RS's discretion, the RS may appoint another trained and knowledgeable employee to walkdown, and review the proposed LO/TO with the LTM.
- Ensure the work has been properly authorized in accordance with COOP work control/conduct of work requirements, the applicable work control document(s) (such as IWCP) and individual facility requirements (including the Plan of the Day), and all training is current for LO/TO.
- Ensure that the isolator has a copy of the work control documents for the evolution.

NOTE: *The work control document(s), documents any information necessary for a successful application of LO/TO or TO. The amount of guidance given will depend on the complexity of the job, and the hazards identified by the JHA. IWCP may give no guidance for performing a LOTO in simple and straightforward situations, and rely exclusively on the skill of the craft. For more complicated situations, step by step instructions may be a part of the work package.*

4.4 LOCKOUT/TAGOUT ISOLATOR

- Position the energy isolation devices per the approved LTP for the controlling organization.
- Install or remove controlling organization LO/TOs or TOs as directed by the LTM.
- Ensure that systems and equipment inside the isolation boundaries are tested, to be sure the isolation is effective.
- For electrical work this **SHALL** include a test with a voltmeter, as well as an attempt to operate the equipment with the controls. See "voltmeter " definition in Appendix 1.
- Ensure the isolator Section of the LTP and associated tags are properly completed, and the tags are hung properly..

4.5 LOCKOUT/TAGOUT VERIFIER

NOTE: *Verification may be performed immediately following completion of the isolation, but verification, when required per Section 5.2, **SHALL** be provided by a verifier who is **independent** of the isolator. It **SHALL** also ensure that the identification of the item under LO/TO or TO matches the component required to be LO/TO or TO by the isolator, and by the LO/TO permit. Verification will check that the component's actual position/condition matches the component's required position/condition after the LO/TO or TO has been performed by the isolator. Reference "Independent Verification" in the definition Section of Appendix 1 for further clarification, and Appdx 5 "Verifier's Guidelines" for more detail.*

- Ensure that the system or equipment has been properly isolated by verifying the position of the isolation devices.
- Ensure the proper installation of locks, locking device, and tags in accordance with the LTP. Verify that the locking device prevents movement of the isolation device, and that the lock is secure.
- Promptly report any discrepancies in the position of the isolation device or in the LO/TO or TO installation to the LTM. The authorized independent verifier **SHALL NOT** reposition devices or LO/TO elements to "correct" a deficient LO/TO or TO.
- Ensure the LTP and any associated tags are properly completed. Information on tags **SHALL** be identical to that on the LTP.

4.6 LOCKOUT/TAGOUT WORKERS

- Verify or witness the effectiveness of LO/TO as directed by the work control document(s).
- Install PCLs or PCTs in accordance with this practice when working on isolated systems or equipment. Anyone positioned so as to be exposed to hazardous energy, or a dangerous condition if the LO/TO is removed, **SHALL** place a PCL. See definition of LO/TO Worker in Appendix 1.
- Report any concerns about the LO/TO to the LO/TO manager.

4.7 ALL EMPLOYEES

This program applies to all Site contractor employees and subcontractors not otherwise covered through contract agreements. LO/TO or TO isolated equipment **SHALL NOT** be operated, or have operation attempted, except as required as part of an effectiveness

check per Section 5.2.3, and 5.3 of this Chapter. This includes, but is not limited to, valves, breakers, switches or systems isolated by means such as blind flanges or blocking devices that are under LO/TO or TO control.

5. LOCKOUT/TAGOUT REQUIREMENTS

5.1 LOCKOUT/TAGOUT DETERMINATION

5.1.1 When Lockout/Tagout Is Required

This LO/TO or TO program **SHALL** be followed whenever employees could be exposed to hazardous energy sources, hazards associated with safety class or safety significant structures, systems or components, as defined by the NSM (Nuclear Safety Manual) and/or hazardous materials or the unexpected energization of systems or equipment. LO/TO or TO is also used to prevent accidents involving radioactive or hazardous materials and to perform work, or maintain configuration of the building safety envelope for worker, public and environmental protection. Only authorized employees are allowed to perform LO/TO or TO.

Application of LO/TO, LO or TO **SHALL** be job or task specific, requiring separate lock(s) and/or tag(s) applied to each energy isolation device(s) or lockbox, regardless of existing isolations. This will require the use of multiple lock(s) and multi-lock hasps on energy isolation devices or the use of lock boxes, to ensure the integrity of each separate isolation, since portions of the work and associated LO/TOs or TOs may be completed and removed at different times. See “lockbox, use of” in Appendix 1

Double valve or barrier isolation is required in certain circumstances. See *Section 5.6* for details.

When pulling wire in or out of a conduit containing energized, or potentially energized conductors operating at over 50 volts, LO/TO of all circuits in the conduit, is required, unless the work has an energized work permit.

Fire Department personnel, subcontractors, fire systems technicians, and service or maintenance personnel are required to observe the standards of this Site LO/TO program for work or operations, in all cases involving the potential exposure of hazardous energy, except as listed in Section 5.1.2

This program **May** be used to prohibit operation of systems or equipment that could pose danger, or to maintain configuration in the following applications

- Missing, defective or ineffective protective devices (i.e., guards, shields, interlocks)
- Installation or repair
- To maintain configuration required by Authorization Bases
- Maintenance/servicing (such as SP/SS, Section 5.8)
- Construction and demolition activities
- During physical removal of equipment
- Other conditions potentially presenting danger

5.1.1.1 Fire Protection Systems

The fire department has developed impairment and isolation procedures to facilitate outages and ensure prompt restoration of service for fire fighting services. To control the shutdown of fire suppression/detection/alarm systems, the Fire Department and/or their subcontractors, maintenance and service groups, or fire systems technicians may observe

the requirements of their impairment procedures, including the locking and logging of systems and equipment.

The impairment locks applied by any of the fire groups do not meet the requirements for LO/TO, and **SHALL NOT** be used for hazardous energy control. All LO/TO **SHALL** be done per this procedure, and is required to prevent exposure to hazardous energy, except as noted in Section 5.1.2. LO/TO per this procedure may be placed over an impairment lock on a multi-lock hasp, or in addition to the impairment lock in another lock location, for work on systems containing hazardous energy.

5.1.2 When Lockout/Tagout Is Not Required

- Unless required by the work control document(s), live electrical systems or components that operate at less than 50 volts to ground, are not required to be LO/TO or TO if there will be no increased exposure to electrical hazards. An example of increased exposure to electrical hazards is working on equipment connected to a high amperage battery bank operating at less than 50 volts where severe and explosive arcing could occur in short circuit conditions. (Such as a UPS)
- For work on cord- and plug-connected electric equipment for which exposure to the hazards of unexpected energization, startup of the equipment, or release of hazardous energy is controlled by unplugging the equipment from the energy source. In addition, the plug is under the immediate control of the employee performing the servicing or maintenance. See Appendix 1 for definition of “immediate control”
- For specifically exempted electrical systems or work per Chapter 36, (Electrical Safety Program, Section 5.6, Energized Electrical Work). Every attempt **SHALL** be made to de-energize equipment prior to conducting work.
- For work on domestic water or fire water lines operating at less than 140?F, if the isolation device is under the immediate control of the employee performing the servicing or maintenance, and no special hazards are identified. See Appendix 1 for definition of “immediate control”. This exemption specifically includes Fire Department personnel making or breaking connections to hydrants, tanks, and pumpers, or resetting dry pipe valves per procedure, regardless of pressure.
- For minor tool changes or adjustments, when the on-off and/or isolation switch is within arms reach of and under the exclusive control of, the operator. This exception is for machine shop tool operations only.
- For relamping activities.
- Change out of compressed gas cylinder(s), where the cylinder valve is closed, the manifold pressure has been bled to zero, and no other pressure sources feed the manifold.
- Telecommunications or LSDW (Life Safety Disaster Warning System) workers, if *ALL FOUR* of the following conditions are met.

  1. Only analog or digital communications signals (including “ringer” signals), 70.7 volt amplifier output, or speaker transformer secondary voltage are present, and no other electrical hazards exist, that have not been LO/TO’d.

  2. The worker is handling the conductors as if he/she expects them to be energized, so energy release is not unexpected. Reference 29 CFR 1910.147 (a)(1)(i).

  3. Workers are isolated from ground, grounded objects, or wet locations by insulating mats or blankets rated for the voltage involved, and inspected before each use.

4. Insulated tools are used, in good condition, and inspected before each use.

5.2 IMPLEMENTING A LOCKOUT/TAGOUT

If an energy isolation device is capable of being locked out, then LO/TO **SHALL** be used, except as discussed below. Lockout devices may be of commercial or Site manufacture, fabrication or modification, as long as they perform their function on the isolation device they are used on.

TOs alone **may** only be used when it is not possible or feasible to use locks, and an additional safety measure has been implemented, that provides a level of safety equivalent to that obtained by the use of a lockout. (i.e.: removal of an isolating circuit element, removal of a valve handle, removal of fuses, blocking of a controlling switch or the use of lockwire to disable a valve handle). This additional measure(s) will be documented on the LTP.

Employees involved with the TO are to be briefed on the tag only limitations through a pre-evolution briefing.

Verification of all LO/TOs **SHALL** be performed for all Safety Class 1/ 2, and Safety Significant Class 3 equipment and systems, and in all other instances where the safety value of the verification is not outweighed by other factors (except as outlined in Section 5.7). These other factors may be things such as difficult access with risk of injury, or ALARA concerns, etc. Criticality evaluations must be considered before deciding not to use a verifier.
If verification will not be performed, N/A will be marked in the verifier's positions on the LO/TO permit and tag. The reason for not performing an independent verification will be noted under "special instructions" on the permit, with the approval signature of the Facility Manager or designee. In all cases an effectiveness check **SHALL** be performed.

If the equipment is operating, the equipment must be shut down by the applicable operations procedure before the LO/TO or TO is applied. Residual energy must be relieved, restrained and checked as described by the operating procedure. Appropriate means must be employed to prevent energy from being induced into the LOTO system.

5.2.1 Lockout/Tagout Request

Any Site employee (affected employee/worker) or subcontractor may request a LO/TO or TO, or the request is made by an appropriate work control document(s). The requester contacts the LTM assigned to the building, area, system or project, requests the application of LO/TO or TO and explains why it is needed.

5.2.2 Lockout/Tagout Permit (LTP) and Walkdown

NOTE 1: *The LTM, isolator and verifier must each be a different person, for any LO/TO.*

NOTE 2: *For electrical LO/TOs either the isolator, or verifier may perform the effectiveness check with a voltmeter, as long as they are "trained and qualified" electrical workers. See Appendix 1 for definition of "voltmeter", "trained and qualified electrical worker".*

NOTE 3: *If neither the isolator nor verifier is a trained and qualified electrical worker, the isolator will be accompanied by a qualified electrical worker, who will do the effectiveness check.*

The LTM of the controlling organization is responsible for ensuring completion of the LTP (see Appendix 3) and tags, by a trained and knowledgeable person (authorized employee). A trained and knowledgeable person (may be the LO/TO manager, LTM) fills out the LTP and verifies through drawings, written LO/TO or TO procedures for specific equipment, visual inspection of the system (walkdown) or other work control documents that the isolation proposed is complete and accurate. Entries on tags will read the same as those on the LTP and be completed legibly using indelible ink. For instructions on filling out the LO/TO permit and forms, when a verifier will not be used, see Section 5.2, and Appendix 3.

A check **SHALL** be made to be sure that the isolation device(s) is the correct one, before performing the isolation for the circuit or system to be locked out. Do not rely solely on drawings or labels. For electrical LO/TOs, this check may include cycling of the isolation device, signal tracing, continuity checks, or other tests to ensure the isolation device is the correct one. For pressure systems, a check to see if the isolation valves will hold is advised at this time, before applying LO/TO. These activities **should** involve the person who will perform the effectiveness check later.

The LTM and Responsible Supervisor (or designee) in charge of the LO/TO or TO for the affected system/equipment reviews the completed LTP and tags, and verifies through drawings, testing by qualified persons, visual inspection of the system (walkdown) or other work control documents, that the isolation proposed is complete and accurate, before any actual isolation work begins.

5.2.3 Lockout/Tagout Isolation (Placement)

NOTE 1: *The isolator and verifier **SHALL** maintain independence. Reference "Independent Verification" in Appendix I. If necessary, they may operate together to hang and then verify the LO/TO or TO as long as the independence of the two is maintained per this LO/TO program and the COOP manual. Independence must be maintained. The isolator can't be the LTM or Verifier on the same LO/TO.*

NOTE 2: *Electrical work involving the effectiveness testing is considered "live" work, until de-energization is proven. This work is subject to energized work requirements including the pre-evolution briefing, and personal protective equipment (PPE), but does not require an energized work permit.*

- Double check the device number and position against the permit. This is particularly important if a verifier is not used.
- Position the energy isolation device(s) per the approved LTP. If electrical, checks **SHALL** be made for energized conditions resulting from induced voltage, stored energy, common neutrals and/or circuit imbalance carried by neutral conductors in multi-wire branch circuits. Where the wiring is straightforward, isolated, and easily traced, the previous conditions may be visually verified not to exist, but the final voltage measurement must always be made with a voltmeter.
- Install the LO/TO on the isolation device, as described on the LTP. Be sure the lock is securely latched.
- Install the tag(s), either directly attaching the tag(s) to the lock(s) or by means of a self-locking, non-releasable tie (having the general design and basic characteristics of being at least equivalent to a one piece, all environment tolerant nylon cable tie) with at least the strength of 50 pounds.
- Where a tag cannot be affixed directly to the energy isolation device(s), the tag

SHALL be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device (i.e., fastened to cover the device).

- Potentially hazardous stored or residual energy **SHALL** be relieved, disconnected, restrained or otherwise rendered safe. If there is a possibility of reaccumulation of stored energy to a hazardous level, verification of de-energization **SHALL** be continued until the servicing or maintenance is completed or until the possibility of such accumulation no longer exists. In some cases, relieving of stored energy such as that in liquid piping systems, may only be accomplished during the actual work, such as tap and drain operations. Personnel should be briefed on this hazard as directed in the work control package, before the start of the work.
- As long as the system does not affect other components or release hazardous materials, physically manipulate the equipment to ensure that the energy isolation device(s) (valve, switch, etc.) is properly placed and works in a satisfactory manner.
- Initial, date and record time on the working copy of the LTP for each lock and tag applied. See Appendix 1 "Multiple Evolutions".
- Return key(s) and the working copy of the LTP to the LTM or get the LTMs pre-approval to keep the LTP and key(s) at the worksite and have the verifier then perform verification (this process precludes repeated CA (Contamination Area) entries and is used for short term, one shift work).
- Initial, date and record time on the original LTP for each lock and tag applied, upon return of the working copy of the LTP to the LTM.

***NOTE 3**: If the working copy of the LTP becomes radiologically contaminated or is damaged during the isolation process, the LTM will provide another working copy, and the isolator will fill out all pertinent information on the new working copy.*

5.2.4 Lockout/Tagout Verification

***NOTE 1:** See **Section 5.2** to determine when Verification is not required.*

***NOTE 2:** The verifier cannot be the isolator or LTM on the same LO/TO.*

***NOTE 3:** The verifier and isolator must maintain independence, per this LO/TO program and the COOP manual. Reference Appendix 1 "Independent Verification" for more detail on the meaning of "independence".*

The verifier **SHALL** ensure that the system/equipment has been isolated properly by checking that the isolation devices match those called out on the permit, and have been properly positioned, by using the guidance in Appendix 4, "Verifiers Guidelines for Testing Lockout/Tagouts". The verifier **SHALL** check for the proper installation of the tags and locks in accordance with the LTP.

- Ensure that no personnel are physically in the area of the equipment, machine or process that is locked out or tagged out who could be affected by unexpected energization due to failure of an isolation.
- Using the guidance in Appendix 4, perform a verification. This **SHALL** be done independently. Independent means that the individual performing the verification will not be influenced by observation of, or involvement in, the initial lineup that established the component position. Reference "Independence" definition in Appendix 1. For most activities, independence is achieved by separating the initial

lineup and the verification by time and distance. In the event a lockout device obscures the view of the isolation device position, the verification must be completed at the same time as the isolation.

- The verifier **SHALL** ensure the actual component identification (items under LO/TO or TO) match the component required to be LO/TO or TO by the isolator.
- In addition, the verifier **SHALL** ensure that the component's actual position/condition matches the component's required position/condition after the LO/TO or TO has been performed by the isolator.
- Confirm that each energy isolation device is in the isolation position given by the LTP. If any energy isolation device is not in the required position, or if required LO/TO or TO is omitted, the verifier **SHALL NOT** attempt to operate the device, but **SHALL** promptly report the discrepancy to the LTM.
- The verifier's initial's in the "Verified By" column of the LTP implies that the verification was done independently in accordance with this LO/TO program and the COOP manual.
- Document the verification by dating, signing name on tag(s) and initialing the working copy of the LTP.
- Return the working copy of the LTP to the LTM or get the LTMs pre-approval to keep the LTP at the worksite, and notify the LTM that the LO/TO is complete. (This process precludes repeated CA entries and is used for short term, one shift work).

5.2.5 LO/TO Effectiveness Check

- Ensure the integrity of the isolation, by performing an effectiveness check. For electrical LO/TO, the person performing the effectiveness check should have been involved with determining that the correct isolation device has been LO/TO. (Reference the first bullet under 5.2.3.) For electrical LO/TO, this requires a test with a contact type voltmeter, by a trained and qualified electrical worker, (see "voltmeter" and "trained and qualified electrical worker" definitions in Appendix 1).
- As long as the component is locked out, physical manipulation of the equipment controls inside the boundaries of the LO/TO or TO is allowed, but not the energy isolation device(s). The effectiveness checker must initial the LTP when done.

5.3 WORKING UNDER A LOCKOUT/TAGOUT

- After the LO/TO or TO is in place, the LTM or controlling organization authority will inform the worker and/or his supervisor.
- The worker and his supervisor will discuss scope and limitations of the LO/TO or TO.

***NOTE**: The exception to these steps is discussed in Sections 5.2.2 and 5.2.3 when pre-approval is granted by the LTM to approve work conduct by phone or radio. (to preclude repeated CA entries and for short-term one-shift work). The supervisor's responsibility for discussion of LO/TO or TO scope and limitations remains, and can be performed before the use of this exception.*

- The worker may check the isolation LO/TO or TO for accuracy and completeness by reviewing the LO/TO or TO permit and performing a walkdown of the LO/TO or TO to ensure proper placement of tags and positioning of components.
- If the worker is not satisfied with the LO/TO or TO isolation, he **SHALL** report to the

LTM for resolution.

- The system to be worked on will be blocked or vented (per the work control document(s)) or, if electrical, checked for de-energization at the work location prior to work beginning. See "de-energization check" in Appendix 1 for more detail.
- As long as the component(s) are locked out or tagged out, the worker may physically manipulate the equipment inside the LO/TO or TO boundaries, but not the isolation device(s).
- Install PCL or PCT. This includes all workers, or other personnel who would be exposed to hazardous energy or danger, should the LO/TO be removed. See "Personal Controlled Locks", "Personal Controlled Tags" and "LO/TO Worker" in Appendix 1.
- When it is not feasible and/or it is impossible to physically attach multiple locks to an energy isolation device, as in the case where the weight of the multiple locks could damage the device, when situations dictate more than one isolation point to safely isolate the immediate work evolution, or when multiple jobs utilize the same isolation point, a lockbox or equivalent system **SHALL** be used. The definition of PCLs and their use as well as lock boxes is discussed in Appendix 1 under "Personal Controlled Locks", and "Lockboxes".
- In some cases a LO/TO will be done for precautionary purposes, and the system being LO/TO will not be breached, or the hazardous energy accessed, at that time. See "Precautionary LO/TO" in Appendix 1 for an explanation.
- Perform work.
- Remove PCL(s) or PCT(s) when work is complete, or at the end of the shift, if the work will carry over.

5.4 REMOVING LOCKOUT / TAGOUTS

When the required task has been completed, and each worker has removed his/her PCL, the requestor requests the removal of the LO/TO or TO by providing the LTM with a completed LO/TO Removal Request Form, including the LO/TO worker's initials. (See Appendix 5). If the original requestor is not available, a substitute may be selected, however the original requestor **Should** be notified before returning to work, if still involved in the job. The Removal Request Form submittal **SHALL** occur prior to the LTMs approving the final removal of locks and tags. The LO/TO Removal Request Form (including the worker's initials) can be approved by the LTM by phone or radio once the work is complete. (This process precludes repeated CA entries and re-applying a LO/TO after testing or troubleshooting is complete, or all hazards associated with hazardous energy, guarding, etc have been eliminated, and a LO/TO is no longer needed.)

5.4.1 The LTM SHALL:

- Authorize removal of the locks and tags by signing the original LTP and providing a copy to the isolator, or by phone or radio as noted in Section 5.4. Original isolator is not required.
- Assign an isolator to remove the brass locks and/or tags.

NOTE 1: *Removal of any PCL (green) by anyone other than the original LO/TO worker who placed it, requires authorization by the LTM and the controlling organization. This **should** only be done when truly necessary, and generally only after the intended reason for the LO/TO is completed. In such cases, the LO/TO*

*worker must be off-Site and unavailable at home, according to the best available information to the LTM, before removal actions are initiated. The LTM **SHALL** ensure that the original LO/TO worker is notified of the removal before returning to performing work at the Site.*

- Notify the worker that the LO/TO or TO is going to be removed.

NOTE 2: *PCLs and PCTs must be removed prior to the removal of the original LO/TO or TO control(s). (brass lock and tag recorded in LOTO log)*

5.4.2 The Isolator SHALL:

- Before the LO/TO or TO is removed, inspect the work area to ensure that nonessential items have been removed, machine or equipment components are operationally intact and that affected employees have been safely positioned.
- Remove tag(s), lock(s) and locking device(s) listed on the LTP. Remove in order if specified by the LTM or the work control document(s).
- Place each energy isolation device in the position stated and in the order given on the LO/TO Removal Request form, and LTP.
- Return the tag(s), lock(s), key(s) and locking device(s) to the LTM.
- Initial, date and record the removal time of each lock and tag on the original LTP.

5.4.3 The LTM SHALL:

- Verify return of lock(s), tag(s), permit(s), key(s), other locking device(s) and completed forms.
- Close out the LTP and close out the entry in the LO/TO Permit Log.
- Destroy used tags, or ensure they are destroyed if contaminated, rather than bag them out of a contamination area.
- Notify affected personnel of the removal of LO/TO or TO.

5.5 TESTING, POSITIONING, TROUBLESHOOTING AND CALIBRATION OF EQUIPMENT UNDER LOCKOUT / TAGOUT

Removal of LO/TO or TO and re-application associated with testing, positioning, troubleshooting or calibrating equipment **SHALL** be performed as follows:

- Clear the equipment of unnecessary tools and materials.
- Remove PCLs or PCTs. (Individual workers who placed them)
- Submit a LO/TO Removal Request to the LTM, just the same as Section 5.4 for permanent removal, stating devices to have the LO/TO removed, the removal sequence, and the position to be placed in.
- The LTM **should** be present during complex LO/TO removal and replacement, to personally authorize and record each step of the removal and re-application of the LO/TOs. The information recorded **should** be the same as in the following note.
- For less complex LO/TOs, the LTM may issue a sufficient number of signed copies of the LO/TO or TO tags (extra tags) to permit the planned testing, troubleshooting and/or calibration. Subsequent removals and replacements of LO/TO during troubleshooting or testing will use the tags pre-approved and signed by the LTM, and

will be entered on the LO/TO Permit Log. This process precludes repeated visits to the LTM by the isolator during this process. Tags that are not used during the testing, troubleshooting and/or calibration, and the original and subsequently used LO/TO or TO tags **SHALL** be returned to and destroyed by the LTM.

NOTE : *For testing, positioning, troubleshooting or calibrating equipment, only the initial isolation and removal, and the final isolation and removal needs to be recorded on the LTP. Intermediate isolations and removals are to be recorded on the LO/TO Permit Log in the field, with this log later attached to the LO/TO permit. The reasons for this are twofold. First, the final tags will not have the same number as the original tags, as well as the personnel doing the isolation, verification, etc may have changed. Second, an up to date record of what is and is not LO/TO, and the tag number will be preserved. This is especially important if the work is performed over multiple shifts, or if personnel change.*

? Contact the LTM to have an isolator remove the brass lock(s) and tag(s) (per *Section 5.4)* where necessary on the equipment to be operated. The original isolator **should** be used if available. The isolator will remove the locks and tags that are necessary, to allow for the testing, positioning, troubleshooting or calibration of the equipment.

? Test, position, troubleshoot or calibrate the equipment.

? The isolator **SHALL** re-apply LO/TO or TO per Section 5.2.3 of this Chapter using the lock(s) as on the original LTP, with a new tag, as long as the need to re-apply the LO/TO exists. A new permit is not required for each removal and re-application of a LO/TO, however a log entry and new tags and with the LTM's signature are.

? The verifier, when used, **SHALL** ensure the LO/TO or TO has been installed correctly per Section 5.2.4 of this Chapter, following the completion of the testing, positioning, troubleshooting and/or calibration.

NOTE : *Equipment being tested, positioned, troubleshot and/or calibrated **SHALL NOT** be left unattended when any hazard exists, without first re-applying the LO/TO or TO as required on the LTP. This includes all work interruptions, except during emergency building/area evacuations. Failure to comply may result in personnel injury.*

? When not testing, troubleshooting and/or calibrating, and before continuing work, or leaving the equipment in an unsafe condition, a LO/TO must be re-applied. An effectiveness check **SHALL** be performed per Section 5.2.3 of this chapter and all workers **SHALL** install his/her PCL or PCT.

? The preceding steps **SHALL** be repeated as authorized by the LTM until the testing, positioning, troubleshooting or calibrating activities are completed.

? Final removal of LO/TO or TO **SHALL** be done in accordance with Section 5.4 of this chapter. Note the phone approval provision, to avoid re-applying a LO/TO after successful testing, or elimination of all hazards from exposed hazardous energy, removed guards, etc., so that a LO/TO is no longer necessary.

5.6 DOUBLE VALVE ISOLATION / DOUBLE BARRIER ISOLATION

5.6.1 Double valve/barrier isolation **SHALL** be used when one or more of the following

conditions exist, except as noted below:

- System contains a cryogenic substance (except dewars).
- System contains steam or condensate
- When required by criticality safety engineering.
- When mandated by a facility Authorization Basis (AB).
- When system contains liquid or gas over 500 PSIG, or 200 Degrees F.

5.6.2 Double valve isolation **should** be considered for use in the following situations, when conditions warrant, after consulting with Industrial Hygiene, Operations and Radiological Engineering, and considering the results of the Job Hazard Analysis (JHA).

- Systems containing acids or bases in concentrations that are damaging to human skin, hazardous materials that can be absorbed by the skin, or fluids in excess of 140 degrees F, any of which are pumped or pressurized by means other than a static liquid column, and the pressurizing device(s) are not locked out or deactivated.
- Potentially flammable, explosive or asphyxiating gases.
- Where re-pressurization is possible due to a leaking valve, and the system is not vented. (Known leaking valves can't be used as a single, or part of a double valve isolation)
- Where other identified hazards exist, and double valve/barrier isolation will provide a significant reduction of risk.

5.6.3 Double valve isolation is specifically not required on fire or potable water lines, breathing air or plant air lines, as long as the line is open or vented to prevent pressure from re-accumulating from a leaking isolation valve.

Double valve/barrier isolation points for 5.6.1, or 5.6.2, and single valve/barrier isolations for 5.6.2 **SHALL** be developed based on a walkdown from the isolation point(s) to the work location, and a system sketch or single line drawing **SHALL** be developed based on the system walkdown. This drawing **SHALL** be approved by the controlling organization and attached to the LTP. If available, engineering drawings **SHALL** be used provided they have been field verified by the LTM, or knowledgeable person reporting to the LTM. Drawings are to clearly indicate all system equipment, valves, associated interconnected systems and LO/TO or TO isolations. The LTM and Responsible Supervisor (or designee) **SHALL** verify the LO/TO isolation points by walking down the system. Appendix 3 gives information on using actuated valves as isolation points.

If double valve/barrier isolation is required but is unattainable or not feasible, as determined by the controlling organization, then work with single valve/barrier isolation may be authorized as follows. See Appendix 1 for definition of "feasible".

Approval Authority for Single Valve Isolation:

The responsible VP Project Manager or his/her designee can authorize work under a single isolation when a double isolation is required by this procedure. This authorization **SHALL** be based on sound technical judgement, and a review of hazards identified by the JHA. It is contingent on demonstration of effective single valve isolation.

5.7 SINGLE POINT/SINGLE SHIFT (SP/SS) ISOLATIONS

The purpose of this Section is to provide a method by which workers can safely perform Single Point/Single Shift (SP/SS) Isolations. The prerequisites for use of this type of isolation are as follows:

- The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees;
- The machine or equipment has a single energy source which can be readily identified and isolated;
- The isolation and locking out of that energy source will completely de-energize and deactivate the machine or equipment;
- The machine or equipment is isolated from that energy source and locked out during servicing or maintenance;
- A single lockout device will achieve a locked out condition;
- The lockout device is under the control of the authorized employee performing the servicing or maintenance; and,
- The servicing or maintenance does not create hazards for other employees.

Isolations to be performed under this Section are those that the controlling organization has determined can be safely executed on SP/SS tasks requiring single point, single shift isolation. Isolations performed under this Section are used for systems that are not classified by the Nuclear Safety Manual (NSM) as “Safety Class” (SC 1 or 2), or “Safety Significant” (SC 3). SP/SS LO/TOs do not need to be logged or recorded.

SP/SS isolations **SHALL NOT** be used to isolate systems or equipment using over 480 volts AC (nominal).

For SP/SS isolations, the PIL (blue) lock **SHALL** be used by the authorized employee. (no tag or logging required) Additional workers **SHALL** use their PCLs on a multi lock hasp with the PIL, or PCLs may be used on a lockbox, with the lockbox containing the key to the PIL.

5.7.1 INSTALLING A SP/SS ISOLATION

5.7.1.1 The LO/TO Supervisor SHALL:

- Ensure the proposed work has been properly authorized. (See definition in Appendix 1).
- Determine if the SP/SS is a single point, single shift isolation. If the job has multiple isolation points, or extends beyond 1 shift, SP/SS LO/TO **SHALL NOT** be used. One shift can be longer than a standard shift, as extended by overtime.
- If an SP/SS isolation cannot be completed in one shift, the SP/SS isolation **SHALL** be removed and a LO/TO **SHALL** be installed in accordance with Section 5.2 of this program.
- Designate an authorized employee to control overall job performance, associated lockout or tagout authority, control work forces and to ensure continuity of protection.
- Issue work control document(s) to the authorized employee.

5.7.1.2 The LO/TO supervisor or authorized employee SHALL:

- Notify affected and surrounding personnel of the impact of the job.

5.7.1.3 The authorized employee SHALL:

- Position the energy isolation device so as to isolate the sole energy source.
- Physically test the equipment to ensure the equipment is isolated.
- Install the PIL (blue) lock on the energy isolation device, such that the device cannot be repositioned. Use a multi lock hasp if other workers are involved.
- Perform or witness an effectiveness check of the LO/TO. (See "effectiveness check" in Appendix 1) Electrical effectiveness checks **SHALL** be performed by a trained and qualified electrical worker.

5.7.1.4 The worker SHALL:

- Install PCL (green) on a multi-lock hasp with the blue PIL, if there is more than one worker. The person who installed the PIL is not required to install a PCL. See definitions of "Personal Isolation Locks, PIL", Personal Control Locks, PCL", and "Lockboxes" in Appendix 1 for more information.
- Perform work.

5.7.2 Removal of a SP/SS Isolation

5.7.2.1 The worker SHALL:

- Inspect the work area to ensure that:
  - Non-essential items have been removed.
  - System/equipment components are operationally intact.
  - That affected employees have been safely positioned away from the area.
- If applicable, remove PCL (green).

5.7.2.2 The authorized employee SHALL:

- Inspect the work area to ensure that:
  - Non-essential items have been removed.
  - Machine/equipment components are operationally intact.
  - Affected employees have been safely positioned away or removed from the area.
- Verify removal of all PCLs (green) by other workers.
- Remove PIL (blue) and locking device.

NOTE : *Removal of any PCL (green) by anyone other than the original LO/TO worker who placed it, requires authorization by the LTM and the controlling organization. This **should** only be done when truly necessary, and generally only after the intended reason for the LO/TO is completed. In such cases, the LO/TO worker must be off-Site and unavailable at home, according to the best available information to the LTM, before removal actions are initiated. The LTM **SHALL** ensure that the original LO/TO worker is notified of the removal before returning to performing work at the Site.*

- Return lockout device to the LO/TO supervisor.

5.7.2.3 The LO/TO supervisor SHALL:

- Notify the proper authority in the controlling organization that the work is complete.

5.8 PLACING EQUIPMENT OUT OF SERVICE

A piece of equipment or a process may be taken out of service once it has been disabled (i.e., all hazardous energy sources have been relieved and isolated) by using an Information Tag in accordance with Chapter 8 of this manual. In addition, the tag **SHALL** state "Out of Service – Do Not Operate", the date, and the reason the equipment or process was taken out of service in the information block of the tag. LO/TOs may be removed from out of service, or equipment undergoing D&D, when all possible energy paths have been removed, and made difficult to re-establish. Examples are removing a length of pipe, cutting power wires in the power source panel short enough that they can't be re-attached to a breaker without splicing, cutting a power cord, addition of a blind flange, etc. Equipment **SHALL NOT** be removed with LO/TOs still attached or in effect.

5.9 ADMINISTRATIVE REQUIREMENTS FOR LOCKOUT/TAGOUT

5.9.1 LO/TO or TO Restrictions, Altering Boundaries and Missing Tags

The person who discovers that a tag is missing, or has fallen off, **SHALL** notify the LTM of the controlling organization. The LTM **SHALL** verify the validity of the affected LO/TO entry. If valid, a new tag **SHALL** be applied under the same LTP by the original isolator, if available. If not valid, the affected LO/TO entry **SHALL** be removed and closed.

Removal of a brass lock may only be performed after removal of all PCLs. An alternate isolator may be used if the original is not available. For removal of PCLs see 5.4.1, Note 1, for regular LO/TOs, and 5.7.2.2 Note, for SP/SS LO/TOs.

The LTM **SHALL** ensure that the original isolator is notified of the removal before returning to the performance of work at the Site.

Any actions which damage active tags, LO/TO devices or energy isolation devices are prohibited.

No employee **SHALL** tamper with the orientation of or change the position of a device under LO/TO or TO.

5.9.2 LO/TO Permit Log

The controlling organization, shift superintendent or their designated LTMs **SHALL** maintain a LO/TO Permit Log (see Appendix 6). The LO/TO Permit Log **SHALL** designate which permits are open or closed and **SHALL** provide a master list of all active permits.

The LO/TO Permit Log **SHALL** be kept in a centralized location, accessible for review on request, and retained one year after the last closeout. It is then dispositioned in accordance with applicable Site procedures. To facilitate record keeping, the LO/TO Permit Log may be consolidated periodically to list only the currently active permits. In such cases, the superseded log **SHALL** be annotated to show what entries have been transposed to the new log.

5.9.3 Corrections to Documentation

The LTM **SHALL** correct written errors by drawing a single line through the error, writing the correct information next to the error, initialing and dating in the immediate area of the correction in ink. If necessary, a whole entry may be lined out and a new entry made on the next available space. The use of correction fluid and correction tape are prohibited.

5.9.4 Corrective Action on Lockout/Tagout Deficiencies

Deficiencies noted in LO/TO status **SHALL** be reported to the supervisor, who **SHALL**, in turn, report the deficiencies to the LTM of the controlling organization, and the shift manager, or equivalent operational authority.

The supervisor **SHALL**:

- Stop all work being performed under the affected LO/TO until the deficient condition is corrected.
- Confirm the adequacy of the corrective action.
- Recommence the work when authorized by the controlling organization.

The LTM **SHALL**:

- Effect corrections by the process steps specified in Section 5, of this chapter.

5.10 LOCKOUT/TAGOUT PROGRAM ASSESSMENTS

5.10.1 Quarterly Self Assessments

Each project **SHALL** conduct quarterly self-assessments of their LO/TO program compliance in accordance with the Sites' *Management Assessment Program (MAP), Self Assessment Procedures, Site Integrated Oversight Manual (SIOM), and the Site Corrective Action Requirements Manual (SCARM).* This **SHALL** be performed by someone other than the persons using this LO/TO program, and appointed by the VP Project, or Facility Manager. (Reference the requirements of CFR 1910.147 (c) (6)). The assessments **Should** document situations where physical access to tags and/or locks is not feasible (for example, "infinity rooms", unauthorized access areas, etc.). This report **Should** include the results of a review of:

- At least 10% of the new (since the last assessment date) and 10% of the continuing, active LO/TOs and associated permits. These **should** be different from those reviewed on the previous assessment.
- The administrative and field verification portions of the program, **SHALL** at a minimum, verify the administrative aspects of LO/TO and **SHALL** include a visual inspection of locks (brass and PCLs) and tags installed on energy isolation devices and/or lock boxes per Appendix 2.
- Trends and generic problems identified by the self-assessments, as well as resultant corrective actions, and suggested improvements.
- The use of PCLs by all persons required to use them. See "LO/TO Worker" in Appendix 1.
- Identified deficiencies in the LO/TO Program.

This self assessment **SHALL** include information pertinent to the status of the program and also documented evidence of the required inspector/employee interactions identified in CFR 1910.147 (c) (6) (C)&(D). This requirement, according to OSHA interpretations, may be met for lockouts by group meetings between the inspector and LO/TO trained employees, during the assessment, where the deficiencies and their responsibilities under the LO/TO program are discussed. For tagouts, the group meetings must include all "affected employees", in addition to the LO/TO trained employees. (See definition in

Appendix 1.)

Deficiencies noted in implementing the LO/TO program and appropriate corrections **SHALL** be documented in accordance with the SCARM. Self-assessments **SHALL** be reviewed for trends or generic problems. Reference Appendix 2, Self-Audit Checklist for Lockout/Tagout Program Assessments. This form may be used to document self-assessments. Self-assessments **SHALL** be forwarded for review by the Site LO/TO Program Manager.

5.10.2 Annual Programmatic Compliance Review

This LO/TO program **SHALL** be reviewed annually by the Site K-H LO/TO Program Manager. This review will consist of a comparison for compliance of the Site LO/TO Program with applicable OSHA regulations and DOE Orders. The Annual Programmatic Compliance Review Report **SHALL** include at a minimum:

? Number of active LO/TOs.
? All identified deficiencies.
? Trends and generic problems identified by self-assessments as well as resultant corrective actions.
? Suggestions for Site wide programmatic improvement.

5.11 TRAINING REQUIREMENTS

Refer to the Training Requirements posted on the Site intranet.

6. RECORDS

Record Determination	Record Type Determination	Protection/Storage Methods	Processing Instructions
? LO/TO Permit ? LO/TO Removal Request ? LO/TO Permit Log	In-process Quality Assurance (QA) Records (Non-WIPP/LL/LLM)	Responsible Managers (RM) **SHALL** implement a reasonable level of protection to prevent loss and or degradation. RM **Should** define specific protection and storage methods for the document(s), as defined in 1-V41-RM-001. It is suggested that the R M work with Site Records Management organization to assure reasonable controls are being implemented.	Continue prescribed processing of document(s). Once document(s) is/are complete (authenticated) it **SHALL** be handled And controlled as a QA record.
Self- Audit Checklist for Lockout/Tagout	Quality Assurance Record (Non-WIPP/LL/LLM)	Responsible Managers (RM) **SHALL** implement a reasonable level of protection to prevent loss and or degradation. The R M **Should** define specific protection and storage methods for the document(s), as defined in 1-V41-RM-001. It is suggested that the R M work with the Site Records Management organization to assure reasonable controls are being implemented.	When inactive (as defined in 1-V41-RM-001), transfer to Site Records Management in accordance with 1-V41-RM-001.

7. REFERENCES

Conduct of Engineering Manual.

DOE Order 5480.4, *Environmental Protection, Safety, and Health Protection Standards.*

DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities.*

DOE Order 440.1A, *Worker Protection Management for DOE Federal and Contractor Employees*

MAN-066-COOP, *Site Conduct of Operations Manual.*

MAN-071-IWCP, *Integrated Work Control Program Manual.*

MAN-072-OS&IHPM, *Ch 36 Electrical Safety, Ch 8 Marking Physical Hazards….*

PRO-509-CSS, *Plant Power Clearance Requirements.*

Technical Operations Order OO-UD-65, *Plant Power Clearance Requirements.*

1-V41-RM-001, *Records Management Guidance for Records Sources.*

29 CFR 1910.147, *The Control of Hazardous Energy….*

29 CFR 1910.333, *Selection and Use of Work Practices.*

29 CFR 1910.335, *Safeguards for Personnel Protection.*

1-MAN-018-NSM, *Nuclear Safety Manual*

DOE STD 1030-96*, Guide to Good Practices for Lockout Tagout*

DOE-STD-1036-93, *Guide to Good Practices for Independent Verification*

8. APPENDICES

APPENDIX 1

DEFINITIONS AND ACRONYMS

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1.1 SHALL, Should, and May Statements

The word **SHALL** identifies those mandatory requirements or actions, unless prior written justification and approval of an alternate approach is obtained from the OS&IH Program Manager. The word **Should** indicates a recommendation that is based on standards and good safety and business practices. The word **may** indicates when permission is granted, but the action is neither a recommendation or a requirement. **May** statements often provide a suggested or possible course of action when a consistent methodology is not required. For emphasis, these terms appear in boldface throughout this Chapter.

1.2 Definitions

Additional Safety Measure. An additional control device, or action taken, to reduce the likelihood of inadvertent energization, such as lifting leads, pulling fuses, wiring a valve handle, or adding a pancake blind.

Affected Employee. An employee whose job requires him/her to operate or use machines, systems or equipment on which servicing or maintenance is being performed under LO/TO, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed. The affected employee is not required to know how to perform LO/TO or TO, but must understand the general requirements of the LO/TO procedure. The affected employee may also be the worker.

Authorized Employee. A trained and knowledgeable employee who either (1) implements LO/TO or TO on machines, systems or equipment in order to perform servicing or maintenance on that equipment, under the SP/SS LO/TO, or (2) fills out the LO/TO permit for a regular (non SP/SS) LO/TO. An authorized employee and an affected employee may be the same person when the employee's duties also include performing maintenance or service on a machine, system or on equipment that must be locked out or tagged out.

Available. (as for re-using the original isolator to modify or remove a LO/TO, or requiring notification of the original requestor of a LO/TO removal). Available means on plantsite, not physically incapacitated, and still cognizant of the job or operation.

Brass Lock. A lock issued by the LTM to the isolator for use on an isolation device, or on a lockbox that is controlling key(s) to isolation device(s). The LTM controls the key. The lock number is engraved or stamped on the lock. The lock number is recorded in the LO/TO log, and it is always used with a tag. These locks are referred to as brass locks, and **SHALL** be brass in color, to comply with the OSHA requirement for standardization.

Capable of Being Locked Out. An energy isolation device is capable of being locked out if:

- ? It has a hasp or other means of attachment to which, or through which, a lock can be affixed.
- ? It has a locking mechanism built into it.
- ? Lockout can be achieved without the need to dismantle, rebuild or replace the energy isolating device or permanently alter its energy control capability (this can be accomplished by using valve or electrical plug lockout devices).

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The energy isolation device will accept a retrofit lockout device (i.e., valve cover device over a valve hand wheel, commercial lockout device on a ball valve, etc.)

- An isolation device may not be "capable of being locked out", and may just be tagged out, (with the additional safety measure as required by Section 5.2) if the weight of the locking device and lock may subject the isolation device to damage, or if due to the design of the isolation device, the available locking devices are not secure and/or reliable. Examples of this are some 120/208/240v molded case breakers in panels.
- If an energy isolation device is capable of being locked out, then a lockout **SHALL** be used.

Controlling Organization. The organization or individual (facility or project manager) responsible for the operation of the building, utility, facility, system or equipment associated with the work to be performed.

Danger Tag. The LO/TO or TO danger tag is used to identify energy isolation devices and specify their required positions. Use of any other tags for LO/TO or TO is prohibited. The LO/TO or TO danger tag is an approximately 4"x8" rectangular tag (See Figure 1, Danger Tag) used for all LO/TO or TO applications. When the potential for adverse environmental conditions exists, each tag **SHALL** be placed in a plastic locking type bag for protection.

De-energization Check. A check for energy, electrical or other, performed before commencing work, at the location of the work. An electrical de-energization check **SHALL** be performed by a qualified electrical worker, using a voltmeter. (See definition of a voltmeter in this Appendix) The voltmeter **SHALL** be checked for operation on a known source before and after the de-energization check. This check **Should** be performed in the presence of the LO/TO worker(s).

Effectiveness Check for LO/TO. Ensures the integrity of the isolation. For electrical LO/TOs, this requires a test with a contact type voltmeter, by a qualified electrical worker for zero energy. (see "voltmeter" definition in Appendix 1) The person who performs the effectiveness check should have first hand knowledge of any testing prior to the isolation, to ensure the isolation device is the correct one. (This may have included cycling of the isolation device, signal tracing, continuity checks, or other tests.) Checks **SHALL** be made for energized conditions resulting from induced voltage, stored energy, common neutrals and/or circuit imbalance carried by neutral conductors in multi-wire branch circuits. Where the wiring is straightforward, isolated, and easily traced, the previous conditions may be visually verified not to exist, but the final voltage measurement must always be made with a voltmeter. The person performing the effectiveness check signs the LTP, except for SP/SS isolations, which do not require logging.

Energized. Connected to any potentially hazardous energy source or containing residual or stored potentially hazardous energy or hazardous electrical energy induced from another source. Any equipment believed to be de-energized, but not yet verified to be de-energized by an effectiveness check **SHALL** be treated as if energized.

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Energized Work Permit. A permit required by Chapter 36 of OS&IH to perform work on energized systems, listing reasons it is required, and the limits of the permit. The LO/TO effectiveness check is specifically exempt from this permit, although the pre-evolution briefing and PPE for energized work are still required.

Energy Isolation Device. A mechanical or electrical device that physically prevents the transmission or release of energy, and/or ensures or prevents operation or change in position or state of equipment necessary to ensure safety. These devices include, but

are not limited to disconnect switches, circuit breakers, valves, mechanical blocking devices and blind flanges. Push buttons, selector switches or other control circuit type devices are not considered energy isolating devices.

Energy Source. Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other energy.

Exclusive Control. An electrical plug is under the exclusive control of the employee when either of the following conditions prevails:

- The plug is physically in the possession of the employee.
- The plug is within arms reach and in the line of sight of the employee.

Feasible. Ability to perform an operation without introducing additional hazards that increase risk, and can't be fully mitigated.

Immediate Control. An isolation device is under the immediate control of the employee if it is: (1) Within the nearby work area and in line of sight of the employee, such that the employee would be aware of, and could prevent anyone from tampering, resetting or re-energizing the device. (2) Physically in the possession of the employee, such as a cord and plug. (Exclusive Control)

Independent Verification. The verifier will be separated from the isolator by time and distance where possible. When it is not possible for the verifier to determine the isolation component position at a later time, the verifier may accompany the isolator, but must personally and separately confirm the proper isolation device and position. DOE STD 1036-93, "GUIDE to GOOD PRACTICES for INDEPENDENT VERIFICATION" states in Section 3:

> Independence means that the person performing the verification will not be influenced by observation of, or involvement in, the activity that establishes the component position or status. For most operating activities, independence can be best achieved by separating the operation by time and distance……For some operating activities, separating the operation and verification by time and distance may not be possible. For example, verifying the position of a throttle valve or other control may require observation of the positioning activity . . .. For these types of activities, the operator and verifier should independently identify the component and then concur on the action to be performed. The verifier should observe that the operation is performed correctly. This method is termed "concurrent dual verification."

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Isolation (LO/TO). Positioning or placement of energy isolation devices to a de-energized state, necessary to ensure protection of personnel from hazardous energy sources.

Isolator. An authorized (trained and knowledgeable) employee who physically positions the energy isolation devices and installs lock(s) and/or tag(s). The isolator is selected by the LO/TO Manager (LTM). The isolator cannot be the verifier or the LTM on the same LO/TO Permit (LTP).

Knowledgeable Person. A person qualified to operate or work on the equipment being serviced.

Lockbox. A device (capable of being locked) in which the key(s) used in various isolations are stored and controlled. A lockbox may be locked by one or more brass locks for each of multiple evolutions, and the PCLs for each of those evolutions.

Lockbox, use of. A lockbox may be used to contain the keys to the energy isolation device(s) locks, with brass locks on the lockbox for each of multiple evolutions. If a lockbox is used for multiple evolutions, it does not alleviate the responsibility of the isolator and verifier for a new evolution to check the position of the isolation device and locking device by observing it, (not moving it) and making use of other appropriate means, such as observation of system parameters, and tags. Ideally the isolation and verification will be done simultaneously for each evolution. If a lockbox is used, PCLs for each job may be placed directly on the lockbox, or on multi-lock hasps attached to the lockbox. The brass locks and tags for each evolution attached to the lockbox are to be recorded in the LO/TO permit in the same manner as the brass locks on the isolation device locks, and each brass lock **SHALL** have an accompanying tag. The lockbox will usually be located at the job location, or in the LTM's office.

Locking Device for multiple isolations In some cases it may be physically impossible to apply separate locks/hasps (i.e., adjacent breakers). In such cases, one lockout device may be used to isolate multiple circuits for a specific job or task. Each isolation device **SHALL** have a tag.

Lockout (LO). The placement of a lockout device on an energy isolating device that ensures the energy isolating device and the equipment or system being controlled cannot be operated until the lockout device is removed.

Lockout Device. A device that uses a lock, and singular key, and other mechanical devices such as a chain, hasp or bar secured by a lock and key to secure an energy isolation device in the safe position. Locks are to be used in conjunction with tags in all cases where equipment or component configuration allows. Duplication of keys used for LO/TO is prohibited. Included are blank flanges, paddle and bottled slip blinds.

LO/TO Manager. An employee designated in writing by the controlling organization, who is trained and authorized to review, verify, approve and initiate the installation and removal of tags and/or locks. The LTM cannot be the isolator or verifier on a permit he/she issues.

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LO/TO Permit. A pre-numbered form that allows for administrative control and documentation of the LO/TO process used to isolate an energy source (see Appendix 3, Lockout/Tagout Permit).

LO/TO Permit Log. A log that designates which permits are open or closed and provides a master list of all active permits. See Appendix 6.

LO/TO Program Manager. Employee within the Kaiser-Hill Occupational Safety and Industrial Hygiene Department, responsible for oversight of the Site LO/TO program.

LO/TO Supervisor. First line supervisor or foreman, responsible for supervision of the employee performing isolations for the Single Point/Single Shift (SP/SS) evolutions. This term applies to SP/SS isolations only.

LO/TO Worker. Any worker, supervisor or support personnel who would be exposed to hazardous energy if the LO/TO was removed and the energy source re-activated. This could include, but is not limited to craft workers, RCT's, engineers, inspectors, foremen, etc. Examples 1) For electrical work, anyone who breaks the plane of an electrical panel, or is near enough that accidental contact is reasonably possible, would be a LO/TO worker. 2) For entry into a de-inerted plenum or storage vault, where the nitrogen supply valve is LO/TO, anyone near enough to be exposed to the nitrogen rich (oxygen deficient) atmosphere if the LO/TO was removed and the nitrogen turned on, would be a LO/TO worker. The LO/TO worker requires training, and will be issued a PCL (Personal controlled lock)

Minor Tool Change or Adjustment. Machine shop equipment tooling changes or adjustments which take place during normal production operations, which are determined to be routine, repetitive, or integral to the use of machine shop tools for production (See Section 5.1.2). For example: changing bits on a drill press or blades on a saw.

Multiple Evolutions Each evolution **SHALL** have its own LO/TO, (in other words be job or task specific), with a brass lock for each. Multiple brass locks and multi-lock hasps for PCLs may be attached to each isolation device. A better alternative if several isolation devices and/or evolutions are involved, is to place the key(s) for each isolation device in a lockbox, and another brass lock and the PCLs on the lockbox, for each evolution. This is necessary because different jobs using the same isolation device may finish at different times. See "Lockbox, Use of" in this appendix.

In some cases a check and verification of an isolation device and locking device with a LO/TO already installed, must be performed, for a new evolution. An additional brass lock and tag for the new evolution may be installed on a multi-lock hasp on the isolation device, or on a lockbox containing the keys to all of the locking devices. In this case the position of the isolation device must be observed, and the position verified by other means, such as observation of system parameters, and information on the tag. The position of the already locked isolation device may not be disturbed. For this reason it is prudent to do the LO/TO for multiple evolutions at the same time, whenever possible.

Non-energy Isolating Devices. Devices that are not authorized for sole means of

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energy isolation. These devices include, but are not limited to, check valves, control or metering valves, push buttons, selector switches, interlocks and other circuit control devices.

Normal Production Operations. The use of a machine or equipment to perform its intended production function.

Personal Controlled Lock. (PCL) For Permanent and Long Term Employees - Permanently issued lock with one key that **SHALL NOT** be duplicated, used specifically by workers who are going to work under an existing LO/TO. This lock **SHALL** be affixed to a multi-lock hasp or lockbox by the worker. The lock will be green in color with the worker's information (name and employee identification number) engraved stamped, or permanently marked into the body of the lock, for a permanent worker. For short term issue for Temporary Workers, provide a lock with one key that **SHALL NOT** be duplicated, used specifically by workers who are going to work under an existing LO/TO. The lock will be green in color with the worker's information visibly and legibly affixed to the body of the lock. This PCL lock **SHALL** be affixed to a multi-lock hasp or lockbox by the worker at the start of the shift, and removed before leaving at the end of the shift. The worker controls the lock and key. No logging is associated with the placement or removal of the PCL. PCLs are not required on precautionary or configuration control LO/TOs and no hazardous energy is being accessed.

Personal Controlled Tag. PCTs are DANGER tags (see Figure 1, Personal Controlled Tag (PCT)) with the worker's information (name and employee identification number) and "PCT" written on the tag. Figure 1 following Appendix 1 shows an example. Exact style may vary as long as the required information is present. The tags are applied to energy isolation devices when it is infeasible to use locks. PCTs are controlled and issued to the workers for TO evolutions. Each worker must place a PCT at the start of the shift, and remove it at the end of the shift, or when work is completed. If attachment to the isolation device is not possible, it must be located nearby, so as to cover the isolation device.

Personal Isolation Lock. Permanently issued lock with one key that **SHALL NOT** be duplicated, used specifically for single point, single shift isolation by an authorized employee performing a SP/SS LO/TO evolution. This lock will be blue in color with the worker's information (name & employee number)engraved or stamped into the body of the lock. No tag, log entries or paperwork other than that dictated by the work control document(s) is required. The authorized employee who places the PIL will not place a PCL. All PCLs for other workers **SHALL** be removed before the PIL. Approval for the conduct of the work is required from the LO/TO supervisor.

Personal Isolation Tag, This is not allowed. One of the requirements of the SP/SS LO/TO is that the isolation device be lockable.

Precautionary LO/TO. . In some cases a precautionary LO/TO may be performed, when there is no intent to release hazardous energy, or penetrate a system. When there are multiple safety barriers as determined by the JHA, the system need not have PCL's installed by the involved workers, and the workers need not be LO/TO trained.

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An example of this is digging to expose buried utilities, with no intent to breach the utility, or to contact hazardous energy, at that time. One or more utilities in the vicinity of the digging are LO/TO as a precaution. The multiple safety barriers in place are that the utilities are prelocated by drawing reference and tracing, only hand digging will be employed in the vicinity, and the utility is inside pipe or conduit. The laborers doing the digging need not be LO/TO trained, and need not place PCL's. Once the utility pipe or conduit is exposed, the worker who will perform the actual work on the utility, and could be exposed to the hazardous energy, will need LO/TO training, and must install a PCL.

Properly Authorized. In accordance with the COOP Manual work control requirements, Plan of the Day (POD), applicable work control document(s) (such as IWCP), individual facility requirements (including the Plan of the Day), and permission is granted for the work by the proper authority within the controlling organization.

Removal of LO/TO. Act of removing tags and locks from equipment and returning components to normal control and respositioning of isolation devices to the positions given by Appendix 5, LO/TO Removal Request.

Requester (LO/TO) Any company employee or subcontractor having a reason for the application of LO/TO or TO.

Responsible Supervisor The supervisor, manager or foreman who is directly overseeing the work, and is directly in charge of the crafts personnel performing the work. He/she must be LO/TO trained.

Servicing and/or Maintenance. Service and maintenance includes, but is not limited to constructing, installing, setting up, adjusting, inspecting, lubricating, modifying, troubleshooting and repairing machines, systems and/or equipment and cleaning or unjamming machines or equipment, where the employee may be exposed to the unexpected energization or startup of the equipment or release of hazardous energy.

Setting Up. Any work performed to initially install, modify or prepare a machine or equipment to perform its normal production operation.

Single Point/Single Shift (SP/SS) Isolation. A LO/TO which can be accomplished by a single point isolation and which **SHALL** only remain in place one shift One shift may be longer than a standard shift, as extended by overtime for the same worker or work crew that started the work. SP/SS isolation is used when:

1) the machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees;
2) the machine or equipment has a single energy source which can be readily identified and isolated;
3) the isolation and locking out of that energy source will completely de-energize and deactivate the machine or equipment;
4) the machine or equipment is isolated from that energy source and locked out during servicing or maintenance;

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5) a single lockout device will achieve a locked out condition;

6) the lockout device is under the control of the authorized employee performing the servicing or maintenance; and,

7) the servicing or maintenance does not create hazards for other employees.

Tagout. The placement of a tag on an energy isolating device, in accordance with this program. A tag used without a lock **SHALL** be supplemented by at least one additional safety measure that provides a level of safety equivalent to that obtained by the use of a lockout. (i.e., removal of an isolating circuit element, removal of a valve handle, opening of an extra disconnecting device, blocking of a controlling switch or the use of lockwire to disable a valve handle). A TO indicates that the energy isolating device and the equipment being controlled may not be operated until the TO is removed.

Trained and Qualified Electrical Worker A person with demonstrated knowledge of the operation, installation, and construction of electrical systems and equipment, and a knowledge of the hazards involved. Determination of this designation (trained and qualified worker) **SHALL** be the responsibility of the employee's supervisor with input from the employee.

Verifier. Authorized (trained and knowledgeable) employee assigned to verify that LO/TO or TO has been properly implemented. The verifier cannot be the Isolator or the LTM on the same LTP. The verifier **SHALL** ensure the actual component identification (items under LO/TO or TO) matches the component required to be LO/TO or TO by the isolator and the component's actual position/condition matches the component's required position/condition after the LO/TO or TO has been performed by the isolator.

Voltmeter refers to an analog or digital meter such as a Simpson, Fluke or Triplett, that is a contact type device, and can read out a specific voltage value. It does not include devices such as "wiggies", proximity testers, or "tic tracers".

Walkdown. A field verification of system components and integrity performed to establish the basis for the application of a LO/TO or TO.

Work Control Document(s) (LO/TO). Documentation prepared in accordance with MAN-071-IWCP, *Integrated Work Control Program* or a procedure approved by the controlling organization which allows work to progress. LO/TO may be detailed step by step for complex evolutions, or left to skill of the craft for simple or routine work.

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Terminology for Isolation Positions. If an energy isolation device has a position indicator, the LTP and Tags **SHALL** use the terminology on the position indicator. If an energy isolation device does not have a position indicator the following terms **SHALL** be used to describe the isolation position of devices used in the LO/TO or TO:

- Electrical
  - Circuit breakers: On/off
  - Switches: On/off
  - Disconnects: On/off
  - Switch gear: Closed/open
  - Line breakers: Closed/open
  - Tie breakers: Closed/open
  - Fuses: Installed/removed
  - Leads: Connected/disconnected
- Mechanical
  - Valves: Open/shut
  - Relief Valves: Gagged/ungagged
  - Blind Flanges: Installed/removed
  - Springs: Loaded/unloaded

SAMPLE SCENARIO

A lockout/tagout of a fan is required for preventive maintenance and cleaning within the Contamination Area (CA) of Building 707. The expected duration of the work is one shift.

Following the steps of **Section 5**, the LO/TO is requested and a knowledgeable person enters the CA, verifies the drawing accuracy and LO/TO plan for the proposed work. The knowledgeable person exits the CA, fills out the LO/TO permit, gets the LO/TO permit approved by the LTM, and isolator and verifier are assigned to establish the LO/TO. The isolator and verifier enter the CA, establish the LO/TO, including the effectiveness check, sign, verify and hang the tag and brass lock, exit the CA and return the LTP to the LTM. The LTM informs the LO/TO requestor/worker and/or his supervisor that the LO/TO is installed, the worker and supervisor discuss the scope/limitations of the LO/TO, enter the CA, verify the worker is satisfied with the LO/TO, install PCL and complete the work. The worker removes his/her PCL and tells the original requester that the work is complete (may or may not exit the CA). The requester provides the LTM a completed LO/TO Removal Request form. The LO/TO removal is approved, the original isolator is assigned to remove the LO/TO, the isolator enters the CA and removes the LO/TO and then exits the CA to return the tag(s), lock(s), key(s) and locking device(s) to the LTM. The worker may accompany the isolator and verifier to perform the LOTO, and remain in the CA to do the work.

(Alternative process) The work is anticipated to last one shift or less, so following the steps of Section 4.0, the LO/TO is requested and a knowledgeable person enters the CA, verifies the drawing (if existing) and LO/TO plan, exits the CA, prepares the LO/TO permit, gets the LO/TO permit approved by the LTM, and an isolator and verifier are assigned to establish the LO/TO. The isolator and/or the verifier is also the worker(s) and they enter the CA, and establish the LO/TO (isolate, perform the effectiveness

APPENDIX 1

DEFINITIONS AND ACRONYMS

check, verify, sign and hang the tag(s) and brass lock). They then phone from the CA to get permission from the LTM to perform the work (the worker may also have been a third person to the isolator and verifier, and entered the CA with them, again to limit CA crossings). The worker(s) has previously discussed the scope/limitations of the LO/TO with the supervisor, installs his/her PCL and completes the work. The worker(s) removes his/her PCL, informs the original requester and the LTM that the work is complete, gets permission (by phone) of the original requester and LTM to clear the LO/TO, clears the LO/TO, exits the CA and returns the permits, tag(s), lock(s), key(s) and locking device(s) to the LTM.

1.3 Acronyms

CA	Contamination Area
COOP	Conduct of Operations
D&D	Deactivation and Decommissioning
IWCP	Integrated Work Control Program
LO	Lockout
LO/TO	Lockout/Tagout
LTM	Lockout/Tagout Manager
LTP	Lockout/Tagout Permit
PCL	Personal Controlled Lock
PCT	Personal Controlled Tag
PIL	Personal Isolation Lock
POD	Plan of the Day
RCT	Radiation Control Technician
RM	Responsible Manager
Site	Rocky Flats Environmental Technology Site
SP/SS	Single Point/Single Shift
TO	Tagout
TPM	Training Program Manual

Figure 1
Danger Tags, or PCTs

APPENDIX 2
SELF- AUDIT CHECKLIST FOR LOCKOUT/TAGOUT PROGRAM ASSESSMENTS

(Page 1 of 2)

Project:_____

Building #: _____

LTP #:_____

Name of Assessor (Printed):_____

	GENERAL	COMPLIES (Y/N)	COMMENTS (Explain deficiencies and list corrective actions below)
1	Is this part of the K-H OS&IH LO/TO Program Manager's annual programmatic field evaluation?		
2	Is this one of the Project's quarterly self assessments?		
3	Are all spaces on the LTPs completed properly?		
4	Are locks and tags used instead of just tags everywhere that locks can be physically used?		
5	Are the required signatures and initials in place on the LTPs?		
6	Are personnel listed on the LTP appropriately trained?		
7	Are personnel performing the task/job those who were listed on the LTP?		
8	When applicable, are single line drawings attached to the LTPs?		
9	Is the LO/TO Permit Log completed properly?		
10	Are tags securely attached to the energy isolation devices?		
11	Is the tag/lock installed on the correct device?		
12	Do the tag and permit specify the identical isolation position on the device?		
13	Is the device in the position specified on both the tag and the LTP?		
14	Have all sources of hazardous energy been accounted for and controlled?		

APPENDIX 2

SELF- AUDIT CHECKLIST FOR LOCKOUT/TAGOUT PROGRAM ASSESSMENTS

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15	Are unauthorized tags, superseded tags or tags for which no records exist present?		
16	Are deficiencies and corrective actions discovered during this assessment addressed here and included in the quarterly assessment communication to the K-H OS&IH LO/TO Program Manager?		
17	Has the Project's management reviewed their quarterly self assessments for potentially adverse trends and generic problems?		
18	Have quarterly self assessment reports per Section 5.10.1 been submitted?		
19	List employees interviewed during this self assessment or document pre-evolution meeting attendance.	Attach Sheet	
20	Deficiencies?	1. 2. 3. (Use additional sheet, if needed).	
21	Corrective Action?	**(**Align with #s in deficiencies above). 1. 2. 3. (Use additional sheet, if needed).	

Assessor's Signature: _____

Date: _____

APPENDIX 3
GUIDANCE for VALVE ISOLATION PRACTICES

Hand operated valves are always the preferred isolation points to LO/TO a system, when available. In some systems, particularly when double isolation is required, it may be necessary to lock out one of the following types of valves:

Electric motor driven control or throttling valves.
Electric motor driven open /closed valves.
Air operated control or throttling valves. (Usually diaphragm operated, single or double acting)
Air operated open / closed valves. (Spring return or fail-safe operation with an air cylinder)
Air operated open / closed valves. (Double acting non-fail-safe operation with an air cylinder)
Relief valves.
Check valves.

In each case it is necessary to place the valve in the desired position, lock or block it in place, and LO/TO, remove, or block any energy source (electrical, air or spring) that could cause the valve to move from it's desired position. This may require one or more additional LO/TOs. The isolation valve in the system of interest must always be secured and LO/TOd, as well as any systems supplying energy to change the position of the isolation valve.

Electric motor driven control or throttling valves and open / closed valves. Drive the valve to it's desired position using the electric actuator, then LO/TO power to the actuator motor, or, remove the actuator, and LO/TO the valve just like a hand valve. In the first instance there would be a LO/TO on the control valve, as well as a separate LO/TO on the actuator power.

Air operated control or throttling valves. Drive the valve to it's desired position with the actuator, or by hand. LO/TO or disconnect all air to the actuator, preferably at the actuator. Block the stem to prevent movement. Do not rely on air pressure on one side of the diaphragm to hold the valve in the desired position, as it could fail, and void the LO/TO. You will likely need 2 or 3 LO/TOs here, one on the stem block, and 1 or 2 on the air, depending on the type of actuator, and where you LO/TO the air.

Air operated open / closed valves. (Spring return or fail-safe operation with an air cylinder) If the valve fails safe in the position you want, LO/TO or disconnect the air to the valve. Make sure that there isn't a manual handle or shaft exposed where the valve could still be moved. If it exists, it must be secured, as you would a manual valve. You will need 2 LO/TOs, one on the main valve, and one on the air. If the valve does not fail in the position in which you desire to LO/TO it, the safest way is to remove the spring return actuator with the valve in the fail-safe position, then manually turn the valve after the actuator is removed to the desired position, and LO/TO just like a manual valve.

Air operated open / closed valves. (Double acting non-fail-safe operation with an air cylinder) For this situation, all air to the actuator should be LO/TO or disconnected, after the valve has been placed in the desired position. As above, make sure there isn't a handle or shaft exposed. If there is, it too must be secured. You will need 2 or 3 LO/TO, one on the main valve, and 1 or 2 on the air lines, depending on where they are LO/TOd.

Relief valves. Relief valves may be blocked open to provide venting. The block must be LO/TOd.

Check valves. Check valves are not allowed for LO/TO credit under any conditions.

APPENDIX 4
LOCKOUT / TAGOUT PERMIT

(Page 1 of 2)

1. Equipment Description: _____ LO/TO Permit #: _____
2. Equipment Location: _____
3. Reason for Lockout/Tagout: _____

___ _____

5. Printed name and written initials for each of the following:
   - Responsible Supervisor_____
   - Requestor: _____
   - Isolator(s): _____
   - Verifier(s) _____
   - Effectiveness Checker(s): _____

Permit Completed By: _____

Tag No.	Device Description	Device Location	Isolation Position	Lock No.	Approved By LTM \ RS	Installed/Isolated			Verified by \ No Energy	Re-moval Posi-tion	Apprvd By	Removed		
						By	Date	Time				By	Date	Time
					\				\					
					\				\					
					\				\					
					\				\					
					\				\					
					\				\					

6. Special instructions for LO/TO Application
_____
_____
_____
_____

7. Facility Mgr or Designee Approval to Not Use Verifier.
   Device and Tag number_____
   Device and Tag number_____
   Reason_____
   Signature_____

8. Special Instructions for LO/TO Removal: _____
_____
_____

APPENDIX 4
LOCKOUT / TAGOUT PERMIT

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Instructions for Completing This Form

THIS LTP AND TAGS WILL BE FILLED OUT BY A TRAINED AND KNOWLEDGEABLE PERSON FOR THE AFFECTED COMPONENT. THE LTM IS RESPONSIBLE FOR REVIEWING AND VERIFYING THE COMPLETENESS AND ACCURACY OF THE FORM.

1. **Equipment Description:** Equipment to be isolated. Use any descriptive reference available to the equipment to be isolated (e.g., generic name plus identifiers).
2. **Equipment Location:** Specific location of equipment (building, room and/or column).
3. **Reason for Lockout/Tagout:** State reason for Lockout/Tagout (e.g., maintenance, hazardous condition, sampling). List documents associated with this Lockout/Tagout, if known at the time of request (e.g., Maintenance Work Request, etc.).
4. **Requester:** Printed name and written initials of the person requesting Lockout/Tagout of a system / equipment.

   Isolator: Printed name and written initials of the person isolating the device/system.

   Verifier: Printed name and written initials of the person verifying the isolation of the device/equipment.
   Effectiveness Checker: Printed name and written initials of the person doing the effectiveness check.
   Responsible Supervisor: Printed name and written initials of the RS in charge of the LO/TO.
5. **Permit Completed by:** The trained and knowledgeable person designated by the controlling organization to fill out the LTP must print his/her name in this space.

BLANKS ON PERMIT

Tag No.: This is the numerically sequenced number located on the upper left portion of the tag (e.g., 00001).
Device Description: Description of the device being tagged (e.g., Valve 123). The description on the permit and tags **Should** be the same as the information on the device's label plate. If no label plate is installed on the device, the function name for the device **Should** be used (e.g., fill valve, blank flange, main breaker, etc.).
Device Location: List the specific location of the device to be tagged and/or locked.
Isolation Position: State isolation position.
Lock No.: Number of lock installed on isolation device.
Approved by LTM & RS: LTM and Responsible Supervisor for the LO/TO, written initials. For testing, positioning, troubleshooting or calibrating equipment or a process, only the initial isolation and final removal needs to be authorized on the LTP.
Installed/Isolated By: Written initials of the trained isolator who positions the device and places locks and tags.
Date: Date isolation was performed (e.g., month/day/year).
Time: The time each isolation is complete.
Verified by \ 0 Energy: Written initials of the trained Verifier. (N/A if Facility Mgr has signed for no verifier.), and ALWAYS written initials of effectiveness checker for zero energy check.
Removal Position: Position isolation device is to be left in, when LO/TO is removed.
Approved By: Written initials of person in charge of the LO/TO for the affected device. (Responsible Supervisor) These initials authorize removal, indicates concurrence with the device location specified on the LO/TO removal request, and must be initialed before removal of the locks and tags. For testing, positioning, troubleshooting or calibrating equipment or a process, only the final removal needs to be authorized on the LTP.

Removed by: Written initials of the trained and knowledgeable person (isolator) who removes the locks and tags and positions devices as specified in LO/TO removal request.
Date: Date locks and tags were removed.
Time: Time each isolation was removed.

6. **Special Instructions for Application** List any special instructions or approvals necessary for Lockout/Tagout application. If none are required, state none.
7. **Facility Mgr or Designee Signature for No Verifier** No signature indicates Verifier is required.
8. **Special Instructions for LO/TO Removal:** Precautions, sequence etc that is important to follow. If there are no special instructions, state "none".

APPENDIX 5

VERIFIERS GUIDELINES FOR TESTING LO/TOs

(Page 1 of 2)

These guidelines are for use by the verifiers only. No one else is to test Lockout/Tagouts. Reference "Independent Verification" in the definition Section for further clarification.

1. Tagouts Only; No locking Device Applied
   a. If a lockout device has not been applied, do not physically test the position of the energy isolation device.
   b. Confirm by visual inspection that the non-locked energy isolation device is in the position specified by the Lockout/Tagout Permit.
   c. Verify the following, where applicable and in the order given, as indicators of position.
      1) The removal of the energy isolation device (example, removal of fuse or breaker).
      2) The presence of a physical energy isolator, such as a blank flange.
      3) A mechanical position indicator integral with the energy isolation device (example, mechanical position indicator of the switch or valve handle).
      4) A position label and the associated position indicator (example, ON and OFF labeling on a switch and the position of the switch handle).
      5) The physical position of the associated operating mechanism (example, the position of the operating handle of a quarter/turn valve).
      6) The energy medium observed to be not present (example, visually observing that a tank is empty, or downstream pressure indicator reads zero).
      7) A relevant indicator that indicates removal of the energy source (example, downstream pressure indicator or voltmeter indicating zero).
2. Tagouts with Lockout Applied
   a. For the following energy isolation devices that are locked out, do not physically test the position of the device; instead, perform visual inspection per 1 above:
      1) An energy isolation device tagged out to isolate a downstream leak.
   b. For lockout devices that prevent access to the positioning mechanism of the energy isolation device, perform physical testing as follows.
      1) Attempt to gain access to position the energy isolation device; confirm that access is prevented by the lockout device.
      2) Manipulate the lockout device without removing the lock(s) to gain maximum access to the energy isolation device; confirm that insufficient access exists to reposition the energy isolation device.
      3) Confirm that manipulation of the lockout device does not change the position of the energy isolation device.
      4) Verify the applicable items in 1c.

APPENDIX 5

VERIFIERS GUIDELINES FOR TESTING LO/TOS

(Page 2 of 2)

c. For lockout devices that use a restraining bar or chain, physically test as follows:

1) Confirm that the locking device prevents changing the position of the energy isolation device. If a locked valve is involved, confirm that the locking device prevents movement of the valve handle, without actually changing the valve position..

2) Verify the applicable items in 1c.

3) Verify that the lock is latched by attempting to pull it open, being careful not to damage the isolation or locking device.

4) Initial tag when verification is complete. The isolation, verification, and effectiveness check are to all be completed before the tag is signed.

3. Action When Verification Criteria Are Not Met

If visual inspection or physical testing reveals that an energy isolation device is not correctly positioned, a lock is not latched, or that a locking device is ineffective, notify the LTM of the circumstances. Do not initial for the verification.

APPENDIX 6

LO/TO REMOVAL REQUEST

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LO/TO REMOVAL REQUEST

Date: _____

Permit Number: _____

Reason for Removal (initial):

LO/TO Worker Initials:_____ Date:_____

_____ Work Complete

_____ Testing

_____ Other

TAG NUMBER	LOCK NUMBER	DEVICE POSITION
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

SPECIAL INSTRUCTIONS: (e.g. order of removal)

_____
_____
_____

_____
Requester/Designee Signature (For Final Removal Only)

APPENDIX 7

LOCKOUT / TAGOUT PERMIT LOG

(Page 1 of 1)

LOCKOUT / TAGOUT PERMIT LOG—BUILDING(S):_____							
INITIAL LTP STATUS		LTP#	APPLIED or ISSUED TIME/DATE	REMOVED or RETURNED TIME/DATE	REQUESTER	EQUIPMENT/LOCATION	OTHER INFORMATION (LOCK #, & TAG #)
OPEN	CLOSED						